

# 1 Chemistry And Charge In Pi-Space

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## Introduction

In this chapter, I'll discuss Chemistry in Pi-Space. To understand this part of the theory one must understand the Wave within Wave design pattern and the probability Pi-Shells. I'll explain why atoms are attracted into certain patterns and what the atomic orbitals mean in terms of the Pi-Space Theory.

## 1.1 Attraction and Repulsion of Charged Atoms

This is already covered in the Standard Model document. I have copied over the related sections to explain how using a Wave within Wave design pattern we can model charge or + or -.

## 1.2 Modeling Charge In Pi-Space

Charge is another example of waves within waves.

Conventional Physics models charge as positive and negative. When like charges come together, they repel. Unlike charges attract.

Pi-Space can explain why this happens using the wave within wave design pattern.

Coulomb and Newton are similar

$$F_g = \frac{GMm}{r^2}$$

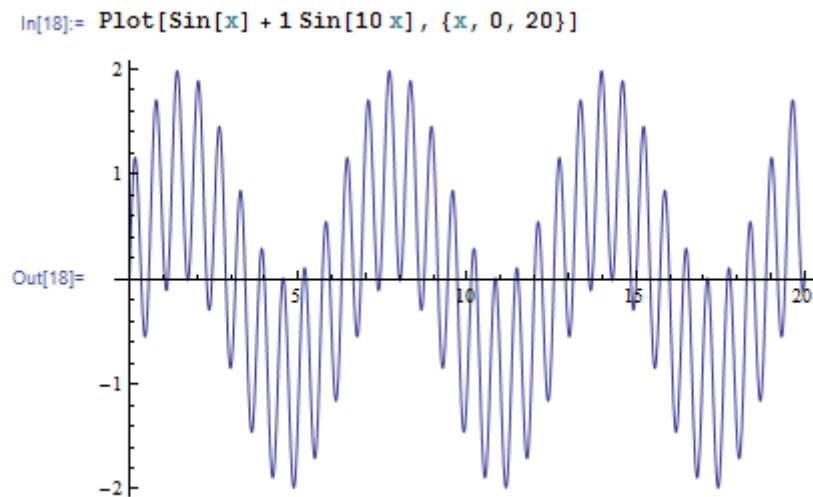
$$F_c = K_e \frac{Qq}{r^2}$$

There are three distinct cases.

1. + and – charges attract.
2. -- repel
3. ++ repel

The Pi-Space rule of Thumb for movement is that a Pi-Shell or particle will move towards the place where the Non Local waves are the smallest. This is how Gravity works in Pi-Space. Mass moves towards the Center of Gravity where the Non Local mass waves are the smallest and the Pi-Shell become smaller. This is the Principle of Least Action.

Recall that Mass waves are Non Local and carried on the Local Wave.



Charge is also Non Local in Pi-Space. It is carried on the EM wave. At present, we model the Charge as a Non Local wave on the Electric wave.

In this case, we can see that we can model the Force between Charge and Mass using the same formula. This is why the Newtonian and Coulomb formula match.

However, this does not explain Positive and Negative Charge and why there is attraction and repulsion.

To explain this we need to add **another set of** waves within the Non Local. For the purposes of this discussion we can call this the “Charge Type Waves”.

Therefore we can define two charge type waves within the Non Local charge.

The Charge Type waves are out of Phase with one another (Sine and Cosine).

We arbitrarily choose the Sine wave as the Positive Charge Wave and the Cosine wave as the Negative wave. We could define this the other way around if we wanted. The point is that they define the two Charge states of Positive and Negative.

Therefore we have

Electric Wave (Local) =>(carries) Charge Quantity (Non Local) =>(carries)  
Positive/Negative Charge Type Wave (Non-Non Local)

We can define a simple notation called  $N(x)$

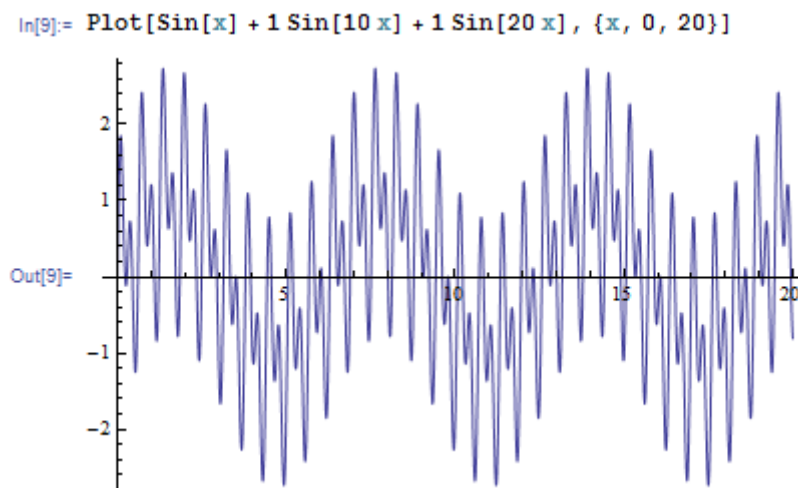
$N(0)$  = Local Wave (Electrical)

$N(1)$  = Non Local Wave (Charge Quantity)

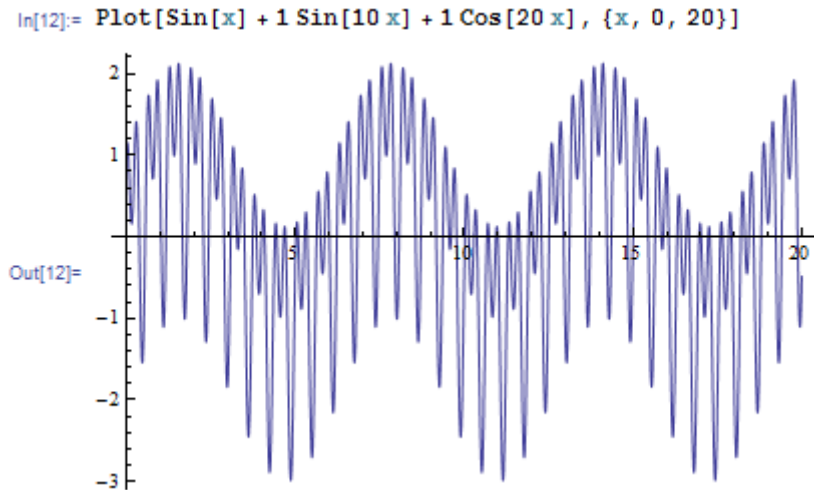
$N(2)$  = Non Non Local Wave (Charge Type, Positive, Negative)

Let's draw the Charge Type Wave

For Positive Charge (we use  $N(2)$  Sine wave). Note the three terms in the formula below indicating  $N(0)$ ,  $N(1)$  and  $N(2)$ .



For Negative Charge (we use  $N(2)$  Cosine wave)



So, let's consider what happens when we combine two of these diagrams.

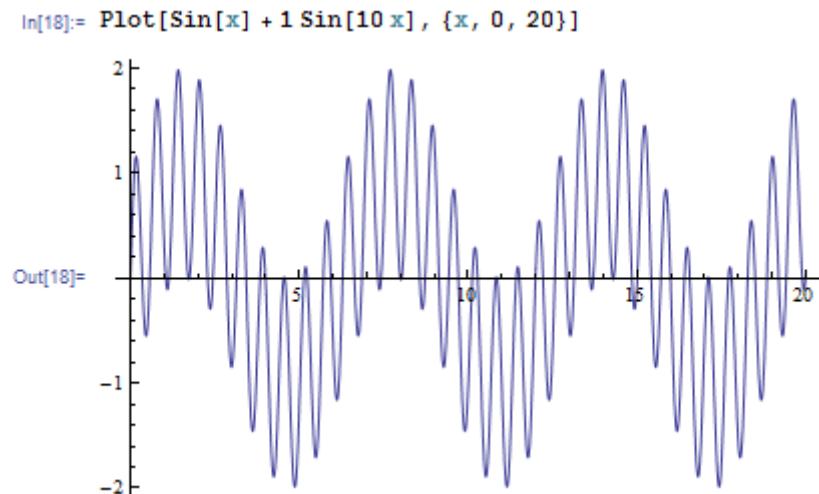
There are three cases.

We can think of N(2) Sine as +--+--+ and Cosine as -+--+--

Case (1) Positive and Negative Charge combine. Both N(2) Sine and Cosine cancel

$$+--+--+ -+--+-- = 0$$

Therefore N(2) cancels and we end up with the a Gravity style Mass Non Local Diagram.

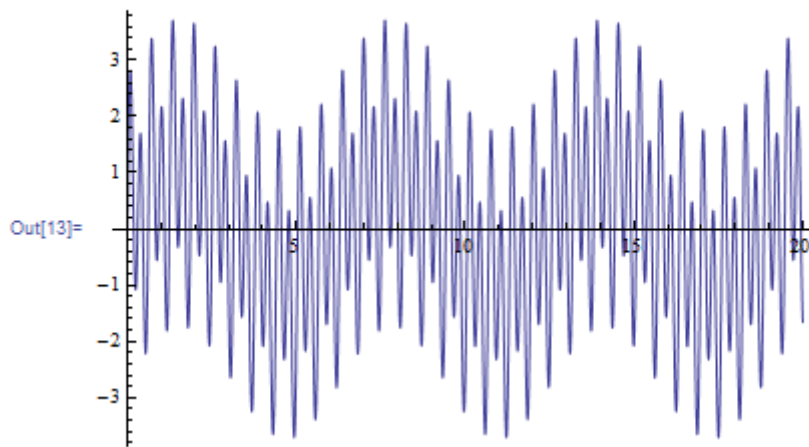


The + and - charges attract. Moving towards one another, the Non Local waves become the smallest. If they move away, the Positive and Negative N(2) charges grow stronger so the particle does not want to move in this direction. This is the Principle of Least Action.

Case(2) Positive and Positive N(2) charges combine. Two Sine waves combine and the amplitude of the N(2) charges increases.

+--+--+--+--+ = N(2) amplitude 2

```
In[13]:= Plot[Sin[x] + 1 Sin[10 x] + 2 Sin[20 x], {x, 0, 20}]
```

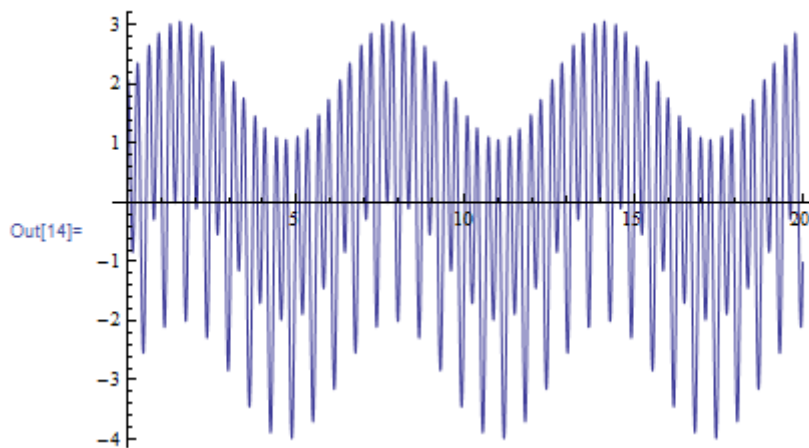


The two positively charge particles will repel as their Non Local waves become larger. So as they move away from one another, they become smaller. Once again the Principle of Least Action.

Case(3) Negative and Negative N(2) charges combine. Two Cosine waves combine and the amplitude of the N(2) charges increases.

--+--+--+--+--+ = N(2) amplitude 2

```
In[14]:= Plot[Sin[x] + 1 Sin[10 x] + 2 Cos[20 x], {x, 0, 20}]
```



The two negatively charge particles will repel as their Non Local waves become larger. So as they move away from one another, they become smaller.

So as we can see it is reasonably simple to model Charge in Pi-Space. We map various attributes like charge to the Waves Within Waves Pi-Space design pattern. Also we don't need to add any new concepts. We are reusing the same ideas over and over again and from this we can derive the attribute of charge and its behavior.

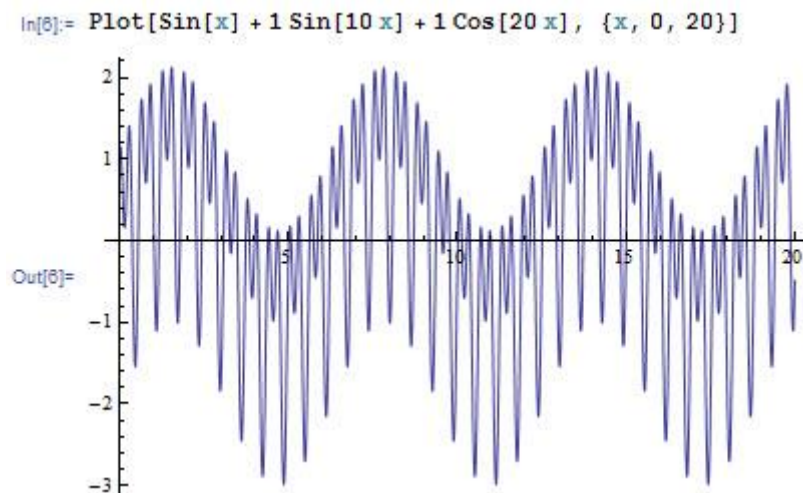
## 1.3 Modeling an Electron and Positron In Pi-Space

An Electron -1 charge

Ne(0) = Sine = Electric Sine wave (photon)

Ne(1) = Sine = Charge

Ne(2) = Cosine = -1 Charge



For Positron Charge +1 (we use Ne(1) Cosine wave). Note the three terms in the formula below indicating Ne(0), Ne(1) and Ne(2).

Ne(0) = Sine = Electric Sine wave (photon)

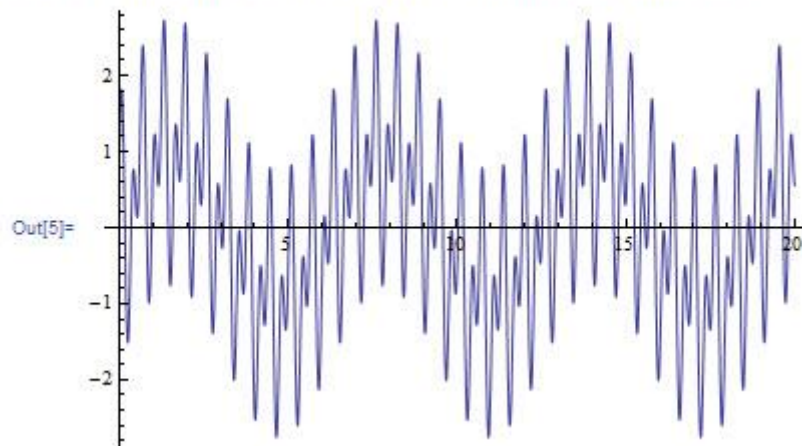
Ne(1) = Cosine = Anti Charge (Positron)

Ne(2) = Sine = +1 Charge

A Positron is an antiparticle. If it comes in contact with an electron they will annihilate.

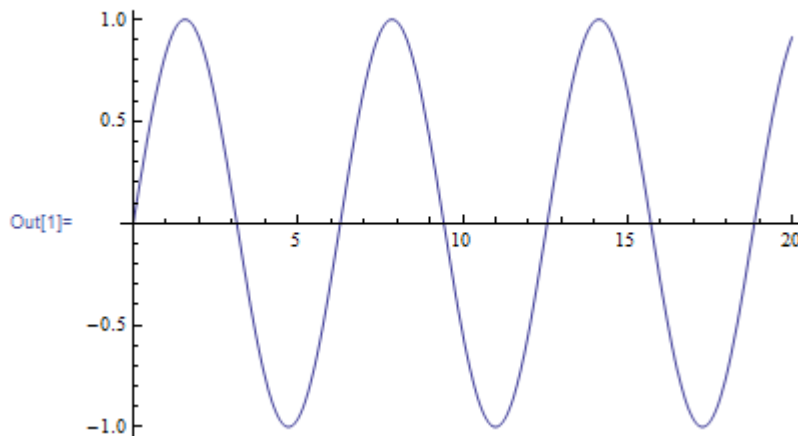
Therefore Ne(0) stays the same. So the charge is an “anticharge”. By this I mean Ne(1) is a Cosine as opposed to a Sine. Inside this is a positive charge type wave which is a Sine wave.

```
In[5]:= Plot[Sin[x] + 1 Cos[10 x] + 1 Sin[20 x], {x, 0, 20}]
```



So if these two collide they will cancel and produce gamma ray photons.

```
In[1]:= Plot[Sin[x], {x, 0, 20}]
```



## 1.4 Modeling an Electron Orbit Using Probability Pi-Shells

Next we represent the probability based standing wave as a series of probability Pi-Shells. These are Pi-Shells which are smaller than the Plank Length and we need to use Probability Theory to represent each point in a Atomic Orbital. Here I will copy the relevant section from the Fields and General Relativity document.

## 1.5 Wave And Particle Duality in the Field

What type of behavior does the Field support? In the Pi-Space definition of a field, waves and particles move through the fields. However, the field itself gives rise to virtual particles and supports our concept of three-dimensionality. Therefore, in each point in a Pi-Space field, the field supports both a wave and a particle. Therefore, the Quantum Mechanical interpretation of wave-particle duality is supported at each layer in a Pi-Space field.

Let's take for example a Gravity field which we know is three dimensional as modeled by the Schwarzschild Metric.

In our case, the local Gravity field is at the FDg(0) layer.

Beneath that is the mass FDg(1) layer. These waves/particles are smaller than the Planck Length. Therefore, these mass field waves can support tiny Pi-Shells which make up the three-dimensional nature of the field.

<i>Field FDg(y)</i>	<i>Name</i>	<i>Size (Decreasing)</i>	<i>Pi-Shell</i>
FDg(0)	Gravity Field	$\geq$ Planck Length	Planet Gravity Field
FDg(1)	Mass Field	$<$ Planck Length	Tiny Pi-Shells

How can we visualize this?

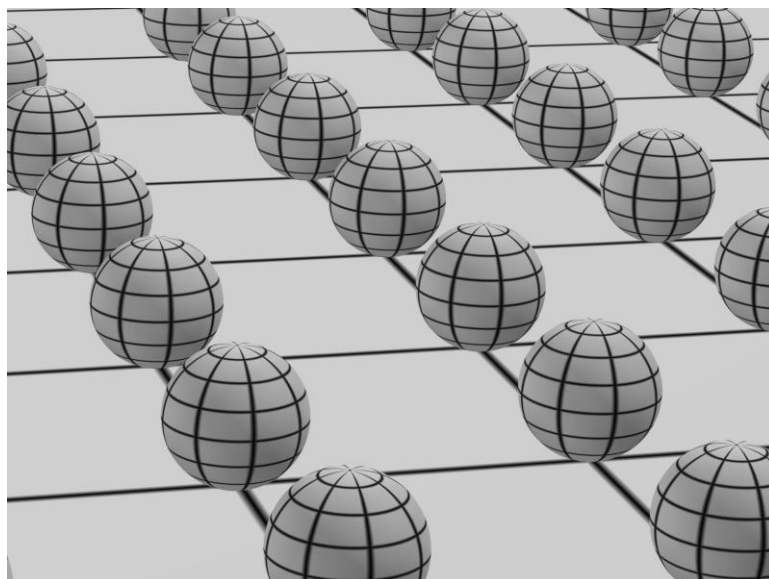
First, we consider the planet. This has already been discussed in the *Understanding Gravity* section in the Pi-Space documentation. Please read this before proceeding if you are unsure.

We can model the Earth as a single field which is a Local Pi-Shell.



Therefore, relative to us, this Pi-Shell is our FDg(0) Pi-Shell.

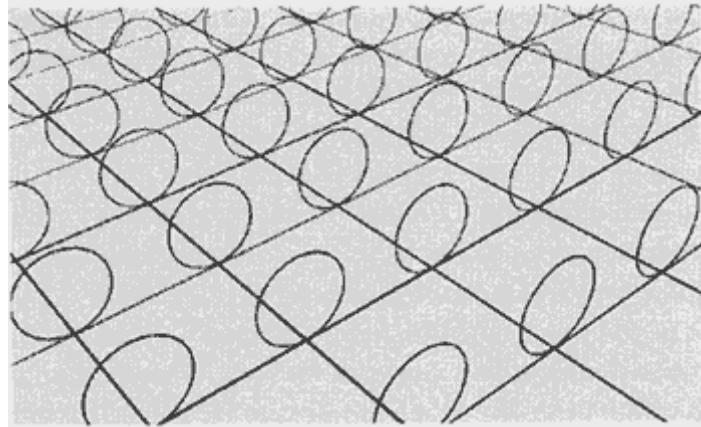
Now, if we go down to FDg(1), it looks like this. Each tiny point in the Mass field which makes up the FDg(0) can itself support Non-Local Pi-Shells.





This is a FDg(1) field view. Note: This is borrowed from the Kaluza-Klein work. I will explain Kaluza-Klein and why it works once I cover Einstein's General Relativity and Electro-Magnetic fields.

One can also imagine the FDg(1) field layer supporting waves, so we can visualize something like this. Note: This diagram is sourced from String Theory.



In terms of a Planet, we can imagine the local wavelength shortening as one towards a Planet sized Pi-Shell field.

Note: The amendment to these diagrams which I will explain is the changing diameters of these Pi-Shells (both large and small) and how this ultimately map to the Einstein concept of Curvature.

## 1.6 Gravity Field And Particle Mass Interaction

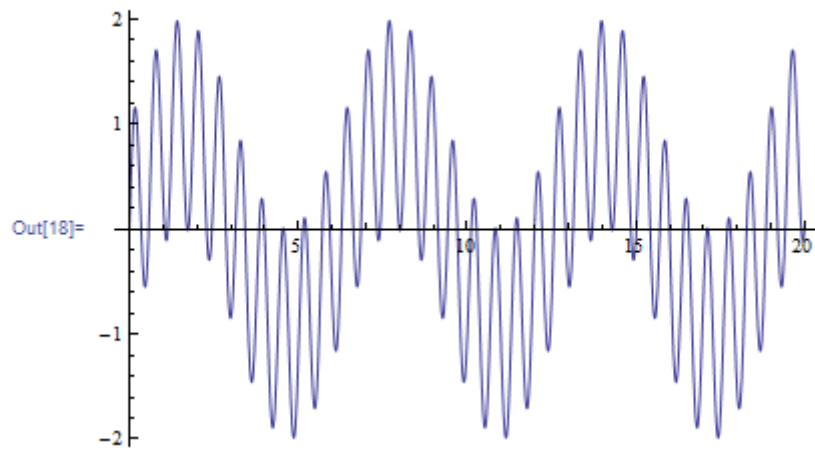
Individual particles contain mass waves at the Ng(1) layer.

These reside in the Ng(0) layer which is a local wave greater than the Planck Length.

Ng(0) = Local wave ( $\geq$  Planck Length)

Ng(1) = Mass ( $<$  Planck Length)

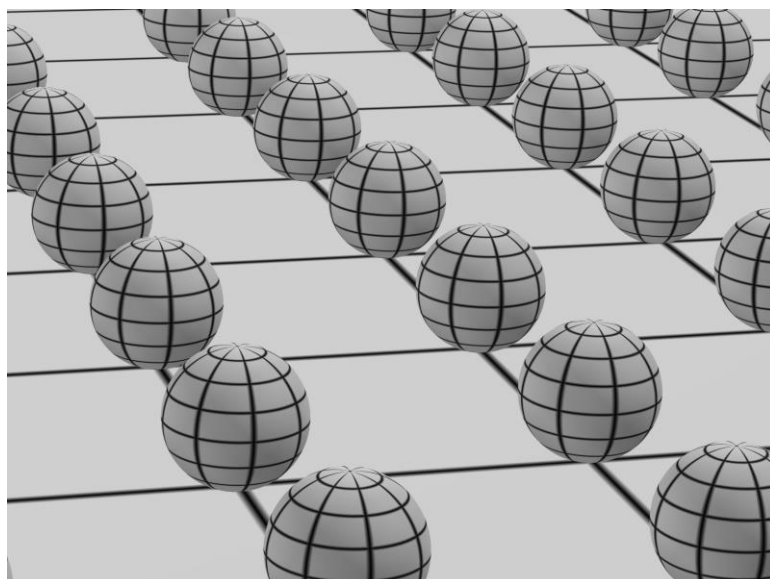
```
In[18]:= Plot[Sin[x] + 1 Sin[10 x], {x, 0, 20}]
```



These mass waves alter the Gravity field points at the FDg(0) layer. The Gravity field points can be represented by either a particle or a wave whose size is greater than the Planck Length. Combined, these points form a planet.



Individually, the planet is composed of wave/particle points, similar to the mass field but these Pi-Shells are greater than the Planck Length.



The degree of interaction of the Ng(1) mass waves to the Gravity field is covered by the Universal Gravitational constant.

Therefore, the total Gravity field is handled by the sum of the planet's mass Ng(1) waves.

The Newtonian Gravity field is the local field FDg(0) and covers sum of planet's mass.

$$FDg(0)_{planetGravityField} = G * \sum Ng(1)$$

However, we need to think in terms of Units. In Pi-Space, force is related to an area change on a Pi-Shell as it escapes from a planet due to the mass of that planet. We think of the planet as a Pi-Shell and the total area loss of the Pi-Shell related to the Ng(1) mass is related to the planet's radius. This is the Gravitational Potential, or total area change for a particle moving from the edge of the field to the center of Gravity.

$$FDg(0)_{planetField} dPotential = - \frac{G * \sum Ng(1)}{r}$$

This is analogous to the Newtonian formula

$$F_{potential} = - \frac{GM}{r}$$

To calculate the area loss in relation to distance for a Pi-Shell moving in the Gravity field, we divide by r once again to figure out area loss of Pi-Shell due to distance.

$$Fg = - \frac{GM}{r^2}$$

Therefore FDg(0) Gravity field alters the Geometry of the Ng(0) particle, making it smaller as it moves towards the center of Gravity. Therefore as one moves in towards the center of the Gravity one gets smaller by  $g/c^2 * h$ .

Note that FDg(0)potential is the sum of all the FDg(0) Gravity field points. These are represented by both a wave and a particle. These wavelengths are greater than the Planck Length.

$$FDg(0)_{planet} = \sum FDg(0)_{fieldPoints}$$

**Therefore we can state that a Gravity field's curvature is the product of the Gravity field points as they become smaller/closer together in the direction of the center of Gravity and are greater than the Planck Length.**

$$\sum FDg(0)_{planetGravityFieldPoints} = G * \sum Ng(1)_{planetMassParticles}$$

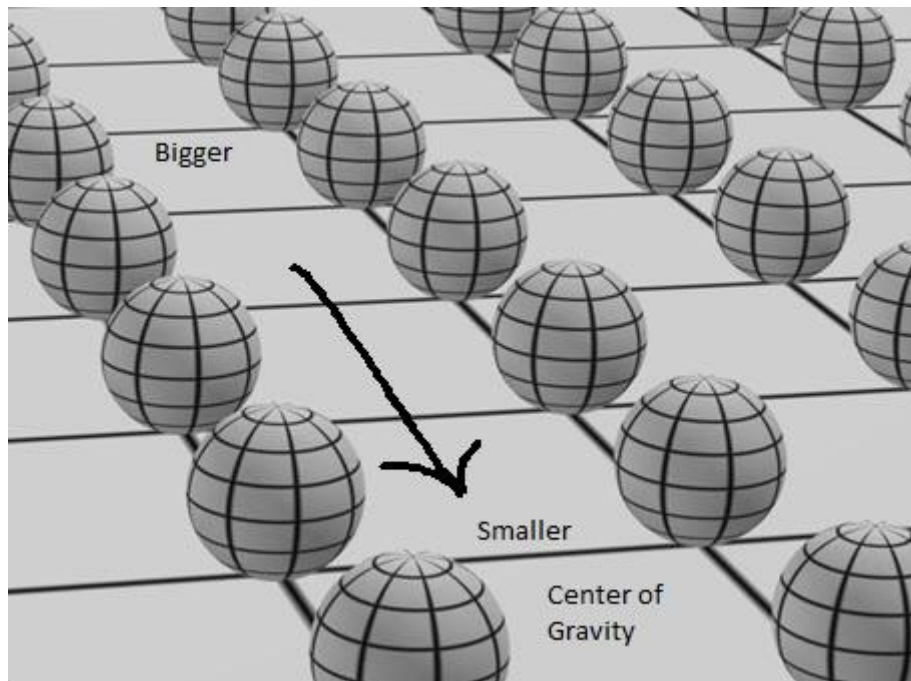
What this means is that the shrinkage of a Pi-Shell as it moves into a Gravity field is the product of the Gravity Field points it moves through. The Gravity Field itself is formed by the Sum of all of the Mass of the Planet's mass  $Ng(1)$  times the Universal Gravitational.

We can divide by  $r$  to get the potential and  $r^2$  to get the area change with respect to distance which is what Newton did.

So now, we have a situation where the mass of the Planet affects the size of the Gravity Field points. Please understand this principle before moving forward.

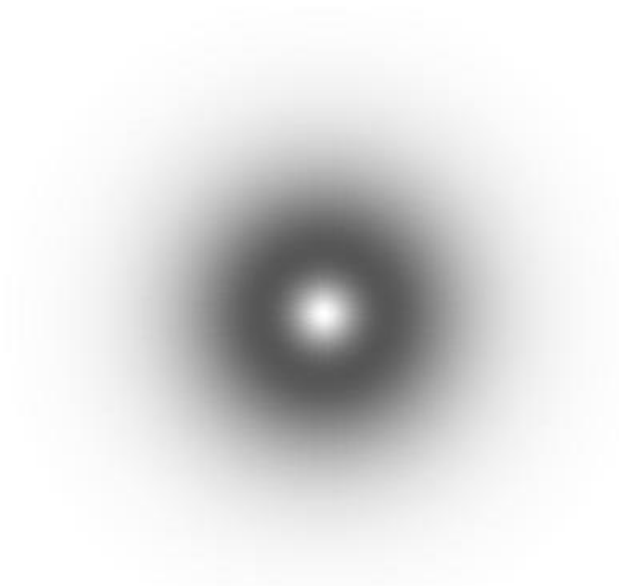
In a weak Gravity field, the change is just  $g/c^2$  area change to an Atom per distance  $h$ , for the Gravity field moving in the direction of the center of Gravity.

Here we draw the Local Field  $FDg(0)$  whose points are greater than the Planck Length (unlike the Mass Field) but whose size is getting smaller in the direction of the center of Gravity.



## 1.7 Probability Field Points in the Atomic Orbital

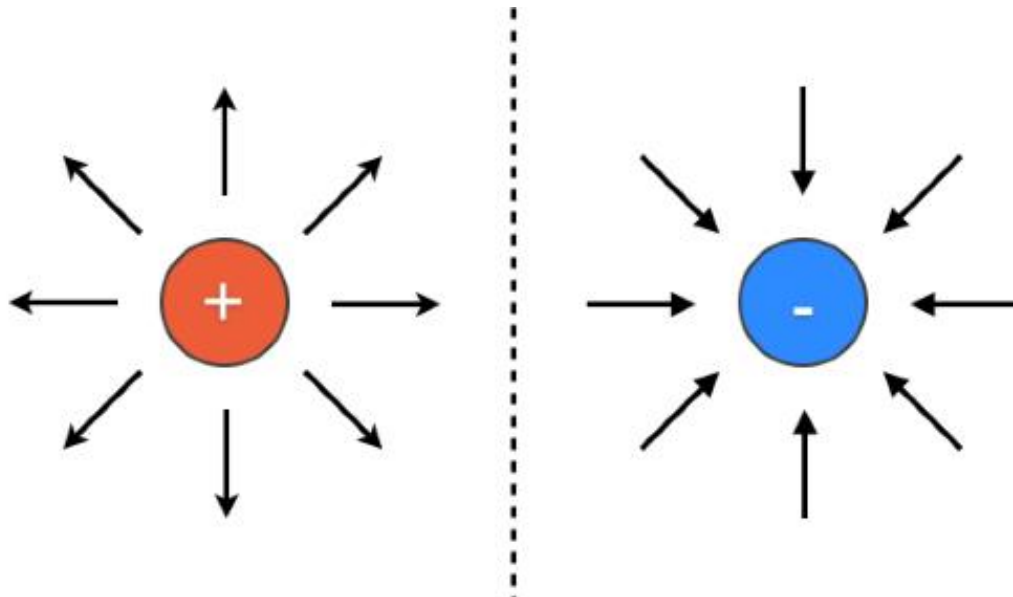
Now that the concept of a Probability Pi-Shell and the Wave within Wave have been formalized. Let's take a look at an Atomic Orbital. The simplest case is Hydrogen. It has an Orbital called a 1 s Orbital.



This is the 1 s orbital. Before we try to understand anything more complex, the first point to make is that each of the points of this orbital are composed of **Charged Probability Pi-Shells according to this theory which make up a Charged Field**. The Probability Pi-Shells are positively charged and are oscillating. Those with the highest probability are the smallest on average and this is where the Electron is most likely to be. All that charged means is that the Probability Pi-Shell carries a wave on the Ne(2) layer which permits attraction and repulsion within the field unlike traditional mass/Gravity based space. Please understand this first before moving forward in your understand of the Pi-Space Theory.

## 1.8 The Electric Field And Charge Probability Pi-Shells

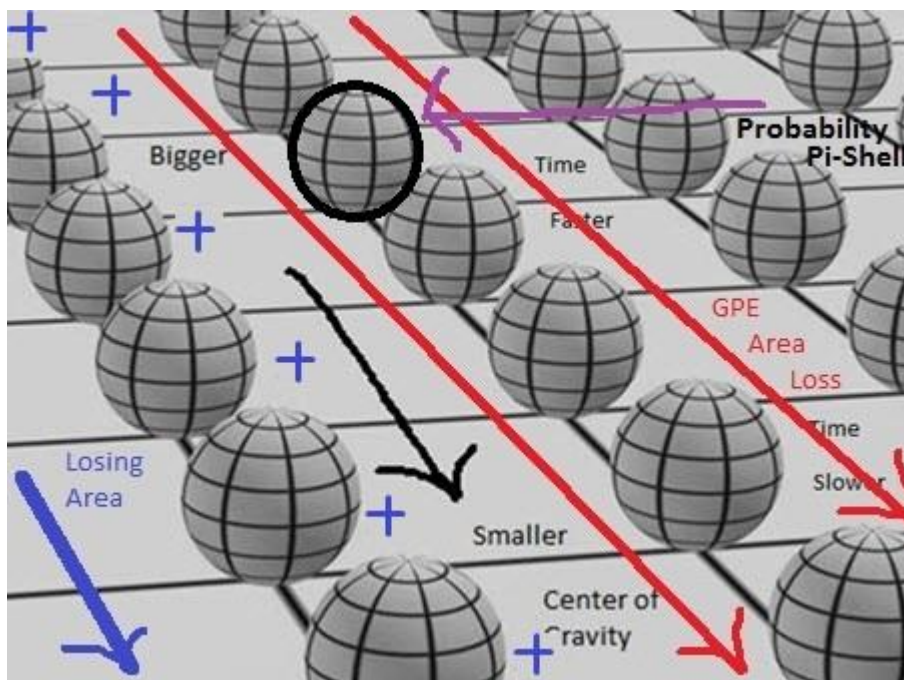
Now that the concept of a Probability Pi-Shell has been established we need to establish this in the context of an Electric field. Typically an Electric Field is positively charged is there is an Atom with additional protons. This is typically drawn and taught in the following way.



The charge falls off as a square of the distance. If we extend the current Probability Pi-Shells we can include some charged Probability Pi-Shells. These exist along-side non charged Probability Pi-Shells.

Charge strength is an area change of the Charged Probability Pi-Shell.

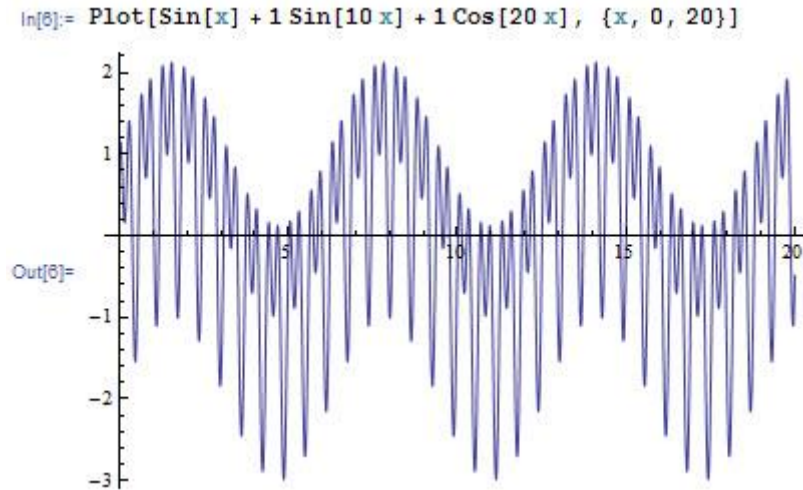
In the diagram, I show positively charged Probability Pi-Shells. What this means is that the N(2) waves carry a charge wave which is positive.



If positively charged Pi-Shells combine with negatively charged Pi-Shells then we get the same as a non-charged Pi-Shell.

An electron generates negatively charged Probability Pi-Shells around it.

Ne(0) = Sine = Electric Sine wave (photon)  
 Ne(1) = Sine = Charge  
 Ne(2) = Cosine = -1 Charge



Therefore it will prefer to move in charged space that is positively charged as it is attracted to it. The location of these spaces is determined by the Atomic Orbitals.

## 1.9 Defining the Size of the Charged Probability Pi-Shells

This is covered by the Schrodinger equation in 3D which covers the probability Pi-Shell at a point and is modeled as a Probability Wave. The higher the probability the smaller the Charge carrying Probability Pi-Shell and vice versa.

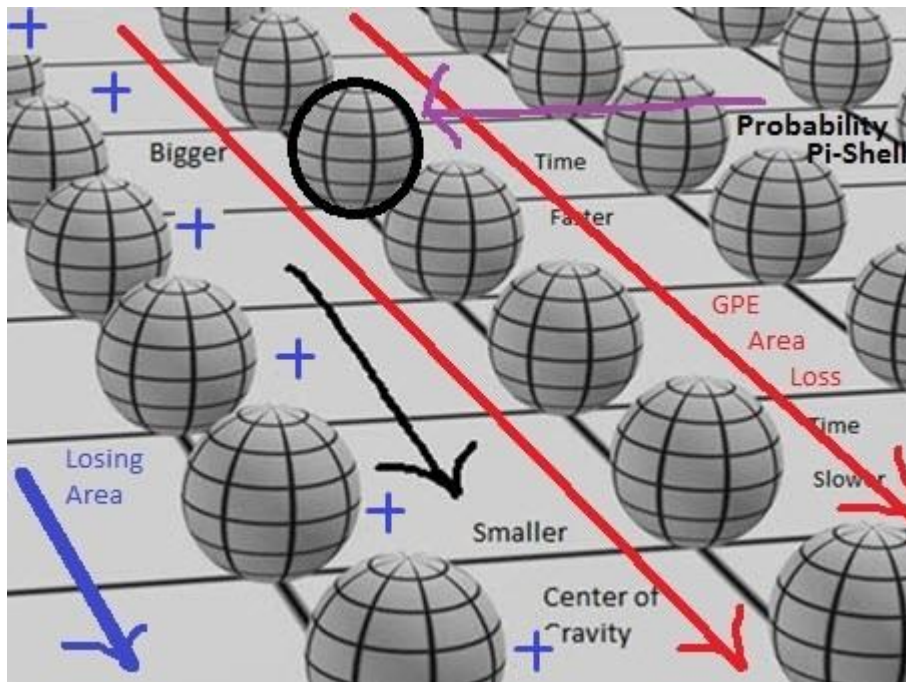
$$\frac{-\hbar^2}{2m} \left[ \frac{\partial^2 \Psi}{\partial x^2} + \frac{\partial^2 \Psi}{\partial y^2} + \frac{\partial^2 \Psi}{\partial z^2} \right] + U(x, y, z) \Psi(x, y, z) = E \Psi(x, y, z)$$

This is a time independent formula. As I have stated before non-local waves travel faster than local waves.

## 1.10 Pairing Probability Pi-Shells and Charge Carrying Probability Pi-Shells

In this theory, each point in Space Time carries two Pi-Shells. One is the traditional mass based Pi-Shell making up the Einstein Space time and the other Pi-Shell is the Charge Carrying Probability Pi-Shell. Together they form charged space and the Einstein Space Time field.

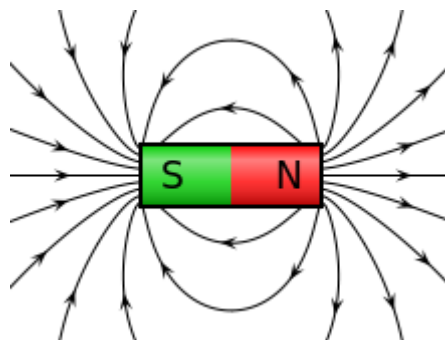




## 1.11 Defining The Magnetic Field Lines

To understand what Magnetic Field lines are we need to extend the idea of Charged Probability Pi-Shells (CProPS). The new idea is that CProPS generate Non-Local Magnetic waves. **Therefore flowing Non-Local Magnetic Waves are the basis of the Magnetic Field in Pi-Space.** These are Non-Local waves which are emitted from the CProPS and moved around charge waves which are unbounded.

What do these flowing waves look like? Traditionally they are drawn as follows.



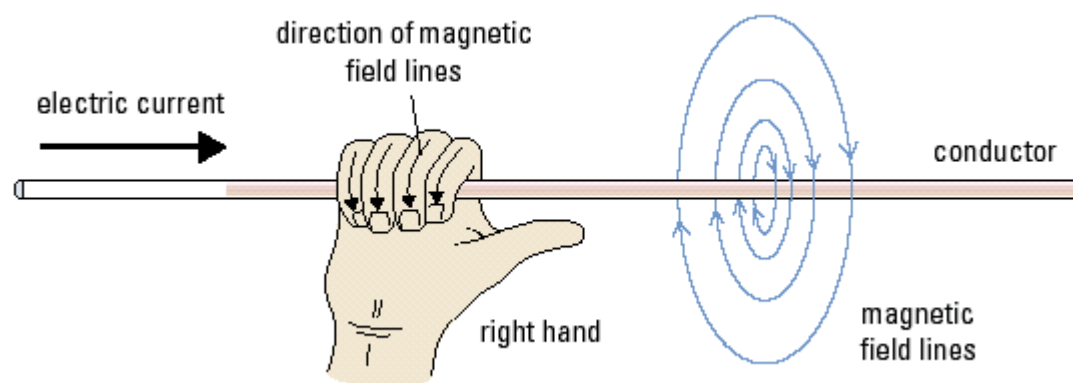
Let's reverse engineer this diagram in Pi-Space so that we can understand what it means from a CProPS viewpoint. The magnet lattice is full of positive charge and this exists inside the CProPS. Typically this causes some kind of magnetic field response. In the CProPS case this means the **Non Local Magnetic Waves are generated which form the basis of our understanding of the magnetic field.** Because of the organized structure of the lattice the Non Local Magnetic Waves (NLMWs) **flow around the unbounded charge waves in the magnet's lattice.**



In an Electron or a Positron these are the Ne(2) or Np(2) waves which can be positive or negative (Sine Wave or a Cosine Wave). See Standard Theory doc.

Ne(2) or Np(2) are the uncoupled waves which produce our concept of the field lines. Importantly these NLMW waves **are flowing Non-Locally so they will always appear to be present in our reality just like a Gravity Field**. We cannot see this flow as they are too small but according to this theory there is a constant flow around the charge waves. **They only flow when there is an unbounded charge**. An unbounded charge is one which has not bound to its opposite charge e.g. negative and positive.

The **concept of the North and the South pole** defines the **direction** of the movement of the NLMWs.



In the case of a charge flowing through a wire, when the electron jumps from its Conduction Band and flows in a unified direction with the other Electrons, it is unbounded, therefore the NMLWs flow around the unbounded charge in similar patterns we call Field Lines.

Therefore the Ne(2) waves cause the NLMWs to flow around it with rules that are well established in Physics e.g. the right hand rule and so on.

Why do they prefer to follow certain paths? The answer is this is to do with their path of least time for Ne(2) in this layer.

The NLMW flow is also at right angles to the charge wave.